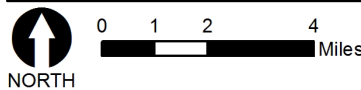
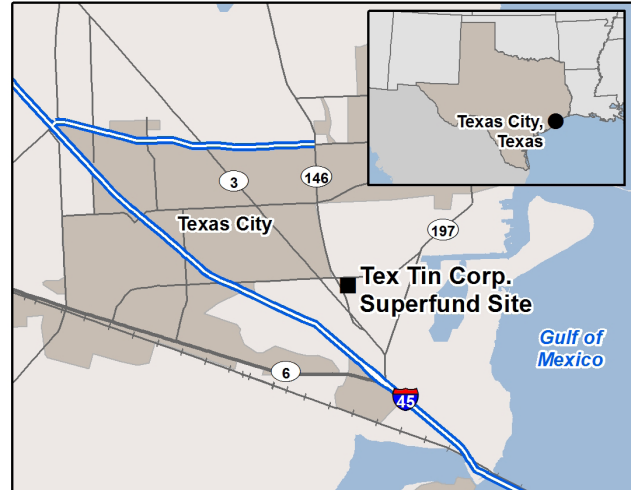


Introduction

The Tex Tin Corporation (Tex Tin Corp.) Superfund site was once a smelter operation responsible for almost half of the world's tin production. After half a century of smelting operations that contaminated soil, sediment and groundwater, the 170-acre site was abandoned, leaving behind slag piles, impoundments, pits and wastewater treatment ponds. Today, the site has been cleaned up and redeveloped and is once again in productive use, supporting nearby industries and communities. It is now home to the Texas City Terminal, a bulk storage facility which receives and stores crude oil and distributes the oil via pipeline to area refineries, as well as a storage and laydown area. This case study tells the story of this transformation.

Located in a heavily industrialized area of Texas City along the Texas Gulf Coast, the site provides easy access to both Galveston Bay and the Gulf of Mexico. Smelting operations, primarily copper and tin, operated on site from the beginning of World War II through 1991. EPA and the community's interest in redevelopment helped guide the cleanup, resulting in an expedited and efficient process that considered future industrial use and maximized the acreage available for reuse. The responsible parties recognized the benefits of redeveloping the site early on, and they worked collaboratively with EPA, and later the redeveloper to make the project a success. Through a phased design-build approach that allowed the cleanup to be more flexible and responsive to new information and changing conditions at the complex site, the project team was able to move forward with constructing one part of the remedy while another part of the remedy was still being designed. As a result of this innovative approach and a strong EPA presence



Sources: Esri, DeLorme, AND, Tele Atlas, First American, UNEP-WCMC and USGS.

The Tex Tin Corp. Superfund site is located in a heavily industrialized area in Texas City, Texas.

in the field, the site went from being listed on the Superfund program's National Priorities List (NPL) to remedy completion in just over five years.

This case study explores the collaboration and cleanup approaches that have led to the successful cleanup and redevelopment of the site. The following sections tell the story of the collaboration, from the initial vision of redevelopment to site stakeholders receiving EPA's Excellence in Site Reuse Award in 2017. The case study provides lessons learned to parties interested in Superfund site redevelopment.



The Tex Tin Corp. Superfund site before cleanup (left); excavation activities at the site (middle); equipment and infrastructure at the Texas City Terminal (right).

Site History, Contamination and Remediation

At the outset of World War II in 1941, the U.S. government contracted to build the Longhorn Tin Smelter, an emergency tin supply plant, at the site. After 13 months of construction, the Longhorn Tin Processing Corporation opened in April 1942 at a crucial time in history when it was the only tin smelter in the Western Hemisphere. By the end of World War II, the smelter was responsible for almost half of the world's tin production. From the late 1950s to 1991, several companies continued to operate at the site. These companies included the Gulf Chemical and Metallurgical Company, later acquired by Associated Metals and Minerals Corporation, which named the facility Tex Tin Corporation in 1984. During the 1970s, the smelter expanded its activities to include production of ferric chloride, molybdenum, vanadium, antimony, bismuth, nickel, cobalt, and copper in the form of oxides or solutions. During the 1980s, a waste oil recovery facility operated on the northwest corner of the site property.

Waste disposal practices on site contaminated soil, sediment and groundwater with hazardous chemicals. EPA added the Tex Tin Corp. site to the NPL in 1990, after years of non-compliance with state environmental permitting requirements. In 1991, Tex Tin Corporation challenged the NPL listing in federal appeals court. In 1993, the U.S. Court of Appeals issued a decision removing the site from the NPL. EPA referred the site back to the Texas Natural Resources Conservation Commission for additional study. After additional study, EPA re-proposed the site for listing on the NPL in 1996. EPA relisted the site on the NPL in 1998.

Past smelting operations had resulted in waste piles, five wastewater treatment ponds, acid ponds and large slag piles requiring remediation. In addition, contamination was located in residential areas west and northwest of the smelter facility and at the Swan Lake salt marsh area. Cleanup focused on soil, groundwater and sediment contamination.

EPA divided the study area into four areas, or operable units (OUs), to manage the cleanup. Each OU had its own prescribed remedy. This case study focuses on the collaborative processes that led to successful redevelopment at OU1.

- OU1 – Former Smelting Facility: This area includes 140 acres of land and four off-site ponds. OU1 cleanup focused on treatment, off-site disposal, on-site stabilization and capped containment of contaminated materials as well as institutional controls. The groundwater remedy included improved evapotranspiration, monitoring and the installation of a slurry wall.
- OU2 – Former BP Amoco Co. Facility: This 27-acre area's remedy was selected as "no further action" after Amoco responded on its own through the Texas Voluntary Cleanup Program.
- OU3 – Residential Properties: The La Marque residential area is about 2,000 feet from the smelter facility. An EPA time-critical removal action addressed residential soils in this area. EPA then selected "no further action" for the final remedy.
- OU4 – Swan Lake Salt Marsh: This ecosystem consists of the area between the barrier islands and the hurricane levee. It includes Swan Lake, the Wah Chang ditch and all associated salt marsh habitats. The selected remedy was the installation of segmented wave barriers (rock jetties) to increase sedimentation and prevent erosion and release of contaminants from the salt marsh area.



The Tex Tin Corp. Superfund site before cleanup.

Remedial action was completed for OU1 in 2003 and for OU4 in 2004. EPA conducts five-year reviews to ensure that the remedies continue to protect human health and the environment. Long-term work to ensure the remedy's continued protectiveness includes regular site inspections, annual groundwater monitoring and EPA five-year reviews.

Project History

1988 to 2000

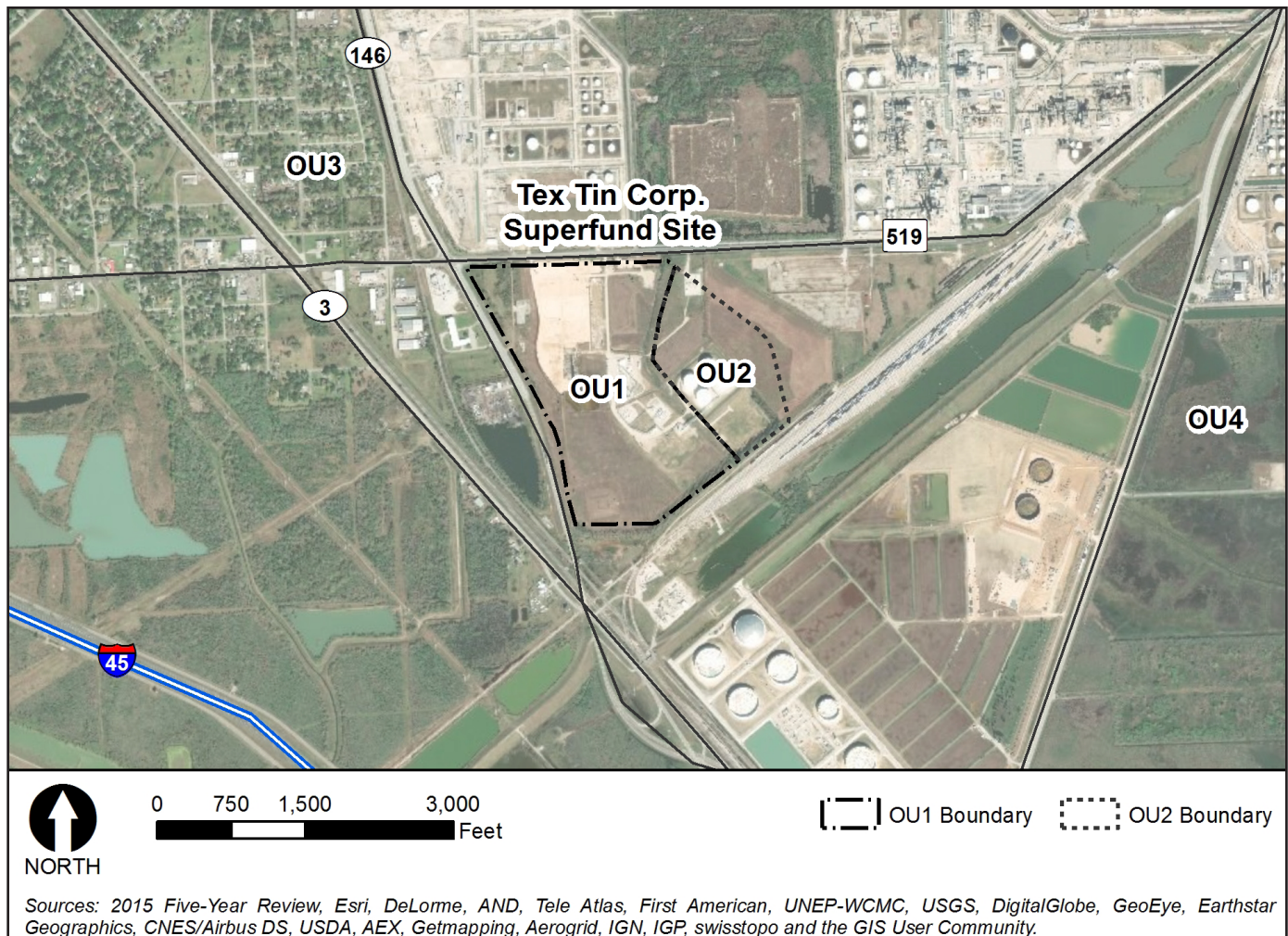
Recognizing Site Conditions, Building Relationships

After the smelter closed in 1991, the 170-acre site was abandoned. “There was basically every waste stream possible – and it was not just the magnitude of the waste, but also the extremely high toxicities of the waste,” recalled EPA project manager Philip Allen. During its operational history, state and local authorities had cited the facility for wastewater and air emissions permit violations. EPA issued a Unilateral Administrative Order (UAO) in 1988, requiring that Tex Tin Corporation fence the facility. That same year, EPA proposed the site for listing on the NPL. EPA finalized the listing in 1990.

EPA removed the site from the NPL in 1993 and relisted it in 1998, as described in the Site History, Contamination and Remediation section on the previous page. After EPA relisted the site, Amoco completed cleanup of its 27-acre property (OU2) under the Texas Voluntary Cleanup program in 1998; EPA completed soil removal

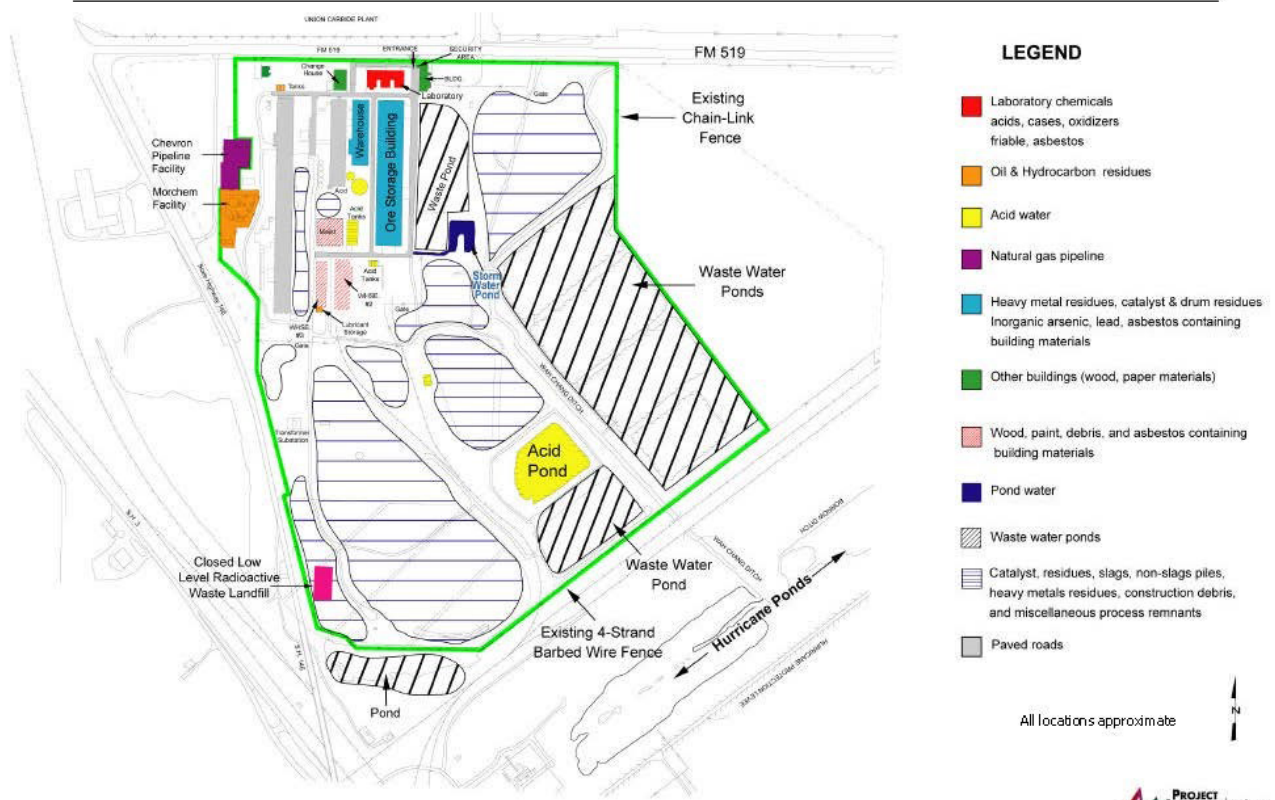
from 24 residential properties (OU3) in 1999; EPA selected a cleanup remedy in a Record of Decision for OU1, the former smelting facility, in 1999; and EPA selected a remedy for OU4 in 2001.

After EPA selected the final remedies for OU1 and OU4, the potentially responsible parties entered into a consent decree with EPA and the State of Texas to clean up OU1 and provide funding for EPA to clean up OU4. To manage the cleanup, the potentially responsible parties formed the Tex Tin Settling Defendants, led by the Tex Tin Steering Committee, a group representing 14 different companies. Committee Chair Edgard Bertaut described the process of identifying committee members: “Each of the settling defendants had the opportunity but not the obligation to nominate someone to the Steering Committee. People on the Steering Committee had a technical charge to implement the remedy, so people who participated were those who were interested in participating.” Participants were eager to clean up the site quickly and in a cost-efficient manner, and it prompted their interest and engagement. Bertaut noted that this was one of the biggest things that made the Steering Committee successful and able to work collaboratively with EPA and other stakeholders.



EPA divided the Tex Tin Corp. Superfund site into four operable units (OUs).

Tex Tin Superfund Site: General Site Features



Conceptual - Generalized site features

PROJECT NAVIGATOR, LTD.

Features of the Tex Tin Corp. Superfund site before cleanup.

The community proactively supported the Superfund process to make sure cleanup moved forward. During the NPL listing, litigation among the federal government, the State of Texas, and more than 100 private parties significantly complicated and protracted the Superfund process. Despite the ongoing legal battles and bankruptcy proceedings, then-Mayor Charles T. “Chuck” Doyle and a local judge were instrumental in prompting the start of cleanup and completing demolition before the next hurricane season. Their efforts led to the District Court issuing a Court Order of Injunction to EPA in May 2000, mandating that EPA conduct an emergency removal action at the former smelter facility (OU1). The purpose of the action was to demolish site buildings in disrepair that were in danger of collapsing before the upcoming hurricane season, as there were concerns that debris from the site might block hurricane evacuation routes in the event of a storm. The emergency removal action was designated as Phase I of the OU1 remedial action.

With remedies selected and demolition completed, the site was on its way to getting cleaned up. The project team’s attention now turned to the future of the site.

2001 to 2003

Considering Redevelopment, Expediting Cleanup

In 2001, EPA’s Superfund Redevelopment Initiative awarded Texas City a Superfund Redevelopment Pilot Grant to identify reuse priorities for the site. The locality used the grant to gather community perspectives on remediation alternatives and reuse options and to fund a reuse assessment for the site. The site’s location meant that it offered significant opportunities for redevelopment. The site is part of a heavily industrialized area dominated by large petrochemical facilities; near the banks of Galveston Bay which is used for commercial and sport fishing, recreation and transportation; and along the Texas City Terminal Railway. With its proximity to the Texas City deep-water terminal, developers recognized the site’s potential to support facilities serving the terminal.

Early in the cleanup process, Carlos Sanchez, EPA’s remedial project manager for the site at the time, had indicated the importance of redevelopment considerations. Bertaut recalled initial hesitation from the Tex Tin Steering Committee. “There were comments like, ‘we don’t own the site anymore, so what’s in it for us?’” he said. “Any value we add to the

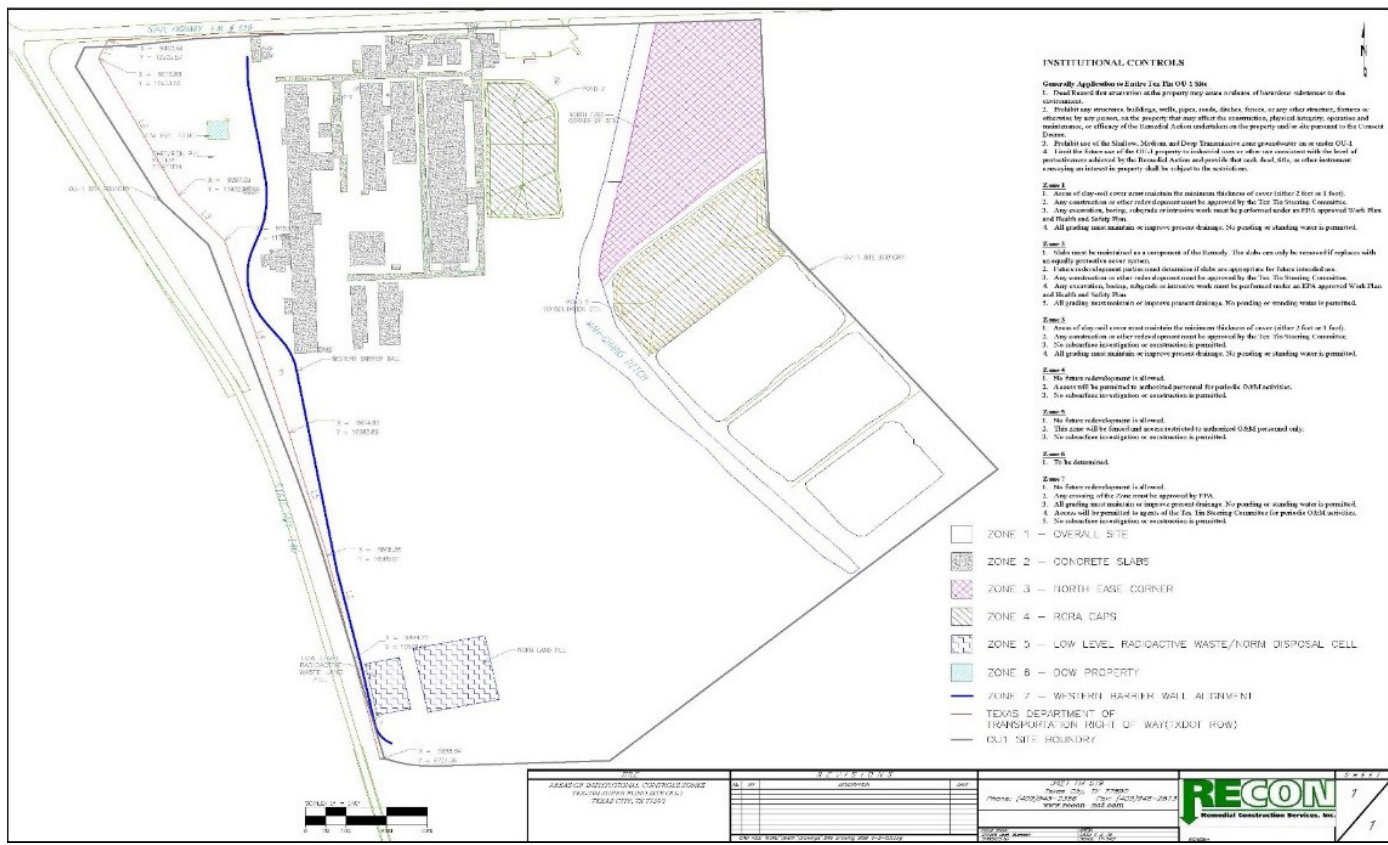
property, we won't get anything out of it." However, as the Steering Committee continued to discuss the redevelopment process with EPA, committee members realized that part of preparing a site for redevelopment involved getting the remedy in place as rapidly and efficiently as possible, which was one of their priorities. Also, redevelopment could help bring other parties to the table; in turn, these parties could later assist with site monitoring and maintenance responsibilities. Having the community's redevelopment vision in place early on and the Steering Committee's support for a redevelopment-oriented remedy helped establish strong communication and collaboration as baselines for the cleanup.

Cleanup began in 2000. Due to the amount and toxicity of contamination at the site, the project team developed a phased design-build approach to the cleanup. They split the cleanup into five separate parts, called "work packages," and contractor Remedial Construction Services, L.P. (RECON) led both the remedial design and construction. This streamlined approach allowed one part of the remedy to be in the design phase while another part was already under construction. This was the first design-build approach at a Superfund cleanup. "This let us get out on the field with boots on the ground and do actual work without needing to first design every part of the remedy," noted EPA project manager Philip Allen. "For example, asbestos abatement could begin right away. Doing that first helped eliminate any exposure risk for the contractors."



Demolition of the original smelter stack at the site.

The phased design-build process made it possible for work on more straightforward projects, such as demolition, to move forward while the project team considered options for more challenging cleanup areas, such as highly acidic sludge. The project team could adapt and respond to changing conditions at the complex site. With a clear redevelopment vision, the team was also able to design the cleanup with the end use in mind. As EPA's Philip Allen recalled, "for each phase, we took a logical approach and worked with contractors to maximize the number of acres that would be available for redevelopment while also minimizing hazards to the workers."



Institutional Control Plan showing site areas that can support redevelopment.

The team consolidated wastes in site areas that were not likely to be used. For example, the naturally occurring radioactive materials containment cell was moved from its planned location at the center of the site to the southwest corner of the site to increase the amount of acreage available for reuse. Robert Piniewski, the project coordinator for the Tex Tin Settling Defendants with Project Navigator, Ltd. (PNL), noted that “we ended up with more usable acreage and developed a grading plan that accomplished our goal of not having standing water and minimal infiltration. We left the site relatively flat and better suited for future construction.” The project team collaborated to support designs and methods that would enhance future development of the site.

To help support the cleanup process, EPA project manager Philip Allen was in the field three-to-four days every week during the remedial design and remedial action. Piniewski recalled that “having Philip on site ready to make decisions on behalf of EPA was instrumental in terms of keeping things rolling.” Allen was able to address challenges as they came up, helping the project team avoid delays. “There were a lot of surprises and a lot of things we didn’t anticipate,” he recalled. “We had to make some decisions as we went along.”

Remedial construction finished in November 2003. The results were striking. As Edgard Bertaut summarized, “the remedy took over 120,000 man-hours without incident and finished nine months ahead of schedule for millions less than the EPA cost estimate.” Throughout the cleanup, Piniewski and Allen provided regular updates to Texas City mayor Carlos Garza, and the team monitored the fence line to make sure cleanup activities did not result in any off-site impacts.

2003 to 2017 Protecting the Remedy during Redevelopment

The site’s cleanup moved fast. As Bertaut recalled, “we went from relisting the site [on the NPL] to completion of the remedy in a little more than five years. It was an extremely short amount of time given the conditions.”

Two additional tools made the site’s redevelopment possible. In July 2003, EPA, the Texas Commission on Environmental Quality (TCEQ) and Texas City co-signed the nation’s first Ready for Reuse (RfR) Determination for OU2. It stated that, as long as certain site conditions were met, the remedy would be protective for industrial uses. A second RfR Determination, for OU1, followed in December 2003. It indicated that 75 percent of the site area was available for redevelopment.

In November 2005, the OU1 property was transferred under an EPA prospective purchaser agreement (PPA) from a bankruptcy trust to Phoenix International Terminals (Phoenix). Given the complexity of the site, with many parties, many settlements and the U.S. Department of Justice’s involvement in representing EPA in litigation, EPA felt that having a formal PPA would be

the most effective way to protect prospective purchasers from liability and encourage development. The agreement included covenants not to sue and provisions for subsequent transfer of the covenants to future property owners and site users.

EPA’s RfR Determinations and the PPA both helped promote the site for beneficial reuse. Phoenix originally intended to use the site to develop an inland port; when plans for the inland port did not materialize, Phoenix sold the property. In 2010, the Port of Texas City’s Texas City Terminal Railway Company purchased the property from Phoenix, received a transfer of the PPA covenants and pursued redevelopment opportunities at the site. In November 2015, Genesis Energy, L.P. (Genesis), an integrated midstream energy company, signed a long-term lease with Texas City Terminal Railway Company for a portion of the site property.

Kristi Unzicker, Environmental Manager at Genesis, noted that “we weren’t looking for a reuse project. However, it was an ideal site given its location near existing pipelines



OU2 Ready for Reuse certificate.



OU1 Ready for Reuse certificate.



Original site conditions in the ore storage building.



The acid pond before cleanup.



Demolition of the ore storage building.



Decontamination of a tank.



Site grading.



Evapotranspiration trees planted on the southern boundary of OU1.

Liability and Superfund Site Reuse

In the past, Prospective Purchaser Agreements (PPAs) were regularly used by the federal government at Superfund sites to address the liability concerns of parties interested in reuse. In 2001, Congress passed the Brownfields Revitalization Act to make the acquisition and redevelopment of contaminated properties like Superfund sites easier. Under the Act, a prospective purchaser need no longer negotiate a PPA with EPA and the federal government. In lieu of a signed agreement, the purchaser could meet requirements to qualify as a bona fide prospective purchaser (BFPP).

Based on several steps, including documenting previous site owners, property uses and existing environmental conditions, the Brownfields Revitalization Act provides designated BFPPs with limited liability protections. The Act also exempts contiguous property owners from Superfund liability and clarifies appropriate inquiry for innocent landowners. Today, an entity would pursue BFPP status rather than a PPA in order to address its liability concerns at a site.

and infrastructure.” The site provided direct connectivity with existing pipeline infrastructure in the area as well as easy and cost-effective access to other key infrastructure and utilities. The site was also near Genesis’ customers. EPA’s RfR Determination and the site’s PPA helped address the company’s concerns about the site’s suitability for reuse. According to Unzicker, the two tools were “very important in evaluating the site” for potential development.

The project team worked closely with Genesis before and after its leasing of the site property. The team was able to clarify areas of the site that could support redevelopment for the company. Robert Piniewski praised the attitude of Genesis staff toward the site. “They weren’t afraid to ask hard questions, and they weren’t afraid of the answers,” he said. He also highlighted Genesis’ approach and dedication to protecting the remedy. “‘Protect the remedy’ was their mantra from day one,” he said. “If it cost a little more so that the remedy was protected, they did it. They had a tremendous attitude and principles in their work. My hat’s off to Genesis for the way they took on this project.”

Genesis began building its Texas City Terminal on site in May 2016. EPA, the Tex Tin Steering Committee, PNL and Genesis coordinated closely during facility planning and construction to ensure the protectiveness of the remedy and the full functionality of the terminal. Genesis hired RECON, the site’s remedial design and implementation contractor, to help oversee protection of the remedy during construction of the terminal. The contractor’s extensive experience and familiarity with the

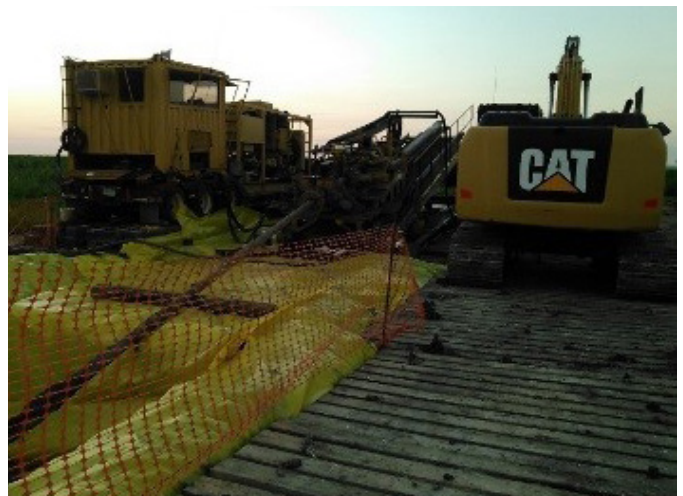
site provided significant project continuity. “They knew the site inside and out,” EPA Region 6 Superfund Redevelopment Coordinator Casey Luckett Snyder noted. RECON’s continued work on site helped the redevelopment process move forward smoothly.

During construction of the Texas City Terminal, Genesis and RECON used several modified construction techniques to protect the remedy. “We took steps to minimize impacts as much as we could, even if it cost a little more,” Kristi Unzicker noted. Genesis and RECON used helical piles instead of drilled and under-reamed piers to avoid generating contaminated drill cuttings. By constructing an overpass across a low-lying area, they avoided disturbing a drainage ditch. They also constructed oil storage tanks on impervious clay placed on top of the capped areas. “There were surprises, but everybody came together to come up with solutions,” Kristi Unzicker said. “It wasn’t just Genesis coming up with ideas to try to get approved. Everyone had ideas, and we were able to get through everything.” For example, when previously undiscovered buried debris was discovered during construction, the team worked together to address the material.

In a little over a year, Genesis completed construction, and the Texas City Terminal opened in May 2017. As of November



Construction of tanks and equipment at the Texas City Terminal.



Terminal construction activities at the site.

2017, the terminal operates at capacity and covers about 60 percent of the available land on the site. “We couldn’t have done it if EPA, the Tex Tin Steering Committee and Project Navigator weren’t doing everything as fast as they possibly could,” Kristi Unzicker noted.

In November 2017, EPA Region 6 presented Excellence in Site Reuse awards to Genesis, the Tex Tin Steering Committee, PNL, RECON, the Texas City Terminal Railway Company, and local officials in recognition of their extensive collaboration, cooperation and leadership throughout the cleanup and redevelopment of the Tex Tin Corp. Superfund site.

Additional reuses are now located on other parts of the site as well. Ecological reuse is underway at OU4, the Swan Lake Salt Marsh. The settling defendants funded construction of breakwaters in Swan Lake to prevent contaminated sediments buried in Swan Lake from eroding and becoming exposed, and the remedy is functioning as planned. “It’s a great fishing spot,” Robert Piniewski noted. “It’s lined with fishermen on a regular basis.” In addition, since 2017, Marathon Oil has been using another part of the Tex Tin OUI property as a storage and laydown facility. Marathon Oil is expanding its refinery operation on the property located next to the site and uses the nearby Tex Tin Corp. site to store pipes, equipment and other vessels while the expansion work is ongoing.

2018+

Reflecting on the Process, Looking Ahead

Today, the project team is excited to share what they have learned about integrating redevelopment with cleanup. The site has been featured in several fact sheets, and project partners shared their perspectives on industrial reuse of Superfund sites during an EPA Superfund Redevelopment Initiative webinar in February 2018. “I view Tex Tin as a Superfund success story,” said Edgard Bertaut. He noted that part of setting up the project for success was based on learning from what had not worked well in the past – the project team included organizations and people who brought a wealth of experiences from other sites to the table.

Bertaut also noted how the responsible parties were able to work through their initial concerns and how the expedited cleanup process benefited the responsible parties, the community and site agencies. “Responsible parties like finished sites because liability issues have been addressed,” he said. “This is a success story about implementation – it was cost-effective, timely and done in a manner that returned the site to productive use. Facilitating redevelopment is really a good long-term strategy.” Bertaut also added, “having the site have value is going to serve those of us who are paying for the remedy.”



Recipients of November 2017 Excellence in Site Reuse Awards, from left to right: Carl Edlund, Region 6 Superfund Division Director; Michael Dobbs and Theresa Harper, Port of Texas City, Texas City Terminal Railway Company; Jeff Gifford, VP of Health, Safety, Security and Environment, Genesis Energy, L.P.; Current Mayor Matthew T. Doyle, Texas City, Texas; Former Mayor Carlos Garza, Texas City, Texas; Former Mayor Charles T. “Chuck” Doyle, Texas City, Texas; Robert Piniewski, Project Coordinator, Project Navigator, Ltd.; Edgard Bertaut and Sarah Dalton, Co-Chairs, Tex Tin Settling Defendants; and Danny P. Brown, Project Manager, RECON Services, L.P.



Aerial view of the site after cleanup.

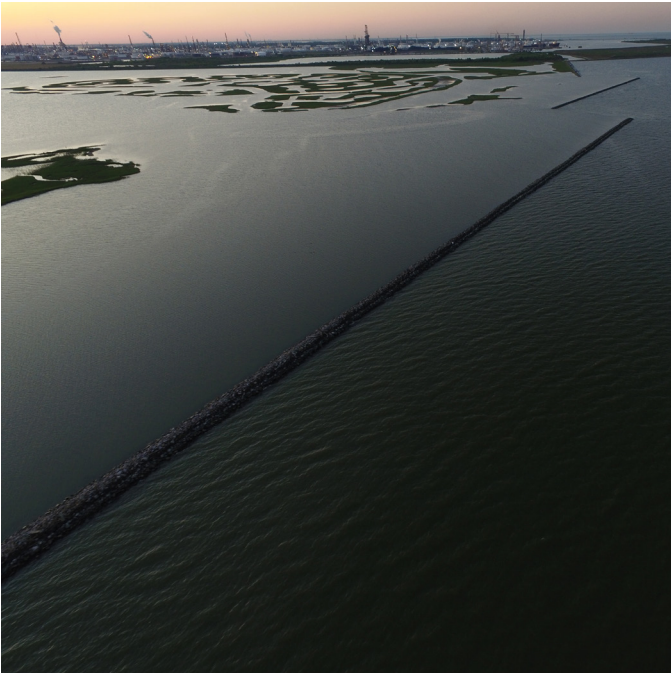
EPA’s Philip Allen cautioned that people should expect similar projects to be challenging along the way. “Every day, something would come up, and we would adapt,” he said. Robert Piniewski recalled his first time visiting the site with the RECON project manager, “We were concerned we didn’t have enough time or resources – but it all worked out through collaboration and teamwork.” Fortunately, the design-build process and having EPA staff on site streamlined and expedited the cleanup process. As Piniewski noted, “the design-build process was really a key factor in helping us complete work ahead of schedule and within the EPA cost estimate.” Bertaut highlighted RECON’s thoughtfulness in implementing the remedy and collaborative spirit, “I can’t say enough about RECON being a key part of our success as well.”

EPA’s Philip Allen reflected on the collaborative, forward-thinking efforts of the team. “Overall, everyone fulfilled their roles and chipped in to contribute to the overall project,” he said. “Everyone had an attitude to do what was best for the project.” Casey Luckett Snyder noted, “the Texas City mayor’s office over the last 20 years – the last three mayors – have really played an important role in coalescing this collaborative team of stakeholders that you see today.” Kristi Unzicker summarized Genesis’ experience working with the project team. “EPA, Texas City Terminal Railway, and the responsible parties have been great partners, providing a streamlined approval process and offering support throughout construction and operations. We look forward to our continued relationship throughout future operations at the site.”

Lessons Learned

A combination of factors has contributed to the project’s successful outcomes.

- Having a redevelopment vision in place early in the Superfund process can help guide the overall remedial and redevelopment process and maximize the amount of space available for redevelopment.
- Communicating early and often with all project partners helps to build trust and collaboration and can help minimize risk and cost during redevelopment efforts.
- Having EPA staff on site regularly and available to review documents and make decisions helps address potential project delays and enables projects to move forward efficiently.
- Using a design-build process to simultaneously design and implement remedies across different parts of a site can help streamline and expedite the remedial process.
- Having contractors with extensive site knowledge and experience with similar projects builds a strong foundation for remedial and redevelopment projects.
- Exploring ways to share operation and maintenance responsibilities with future site owners provides an incentive for potentially responsible parties to engage in cleanup discussions.



Swan Lake Salt Marsh (OU4).



Genesis' construction of the Texas City Terminal.



Marathon Oil's storage and laydown facility.



The Texas City Terminal's oil storage tanks were placed on top of capped areas.

EPA and Reuse: Lessons Learned

Since the inception of the Superfund program, EPA has been building on its expertise in conducting site characterization and remediation to ensure that contamination is not a barrier to the reuse of property. Today, consideration of future use is an integral part of EPA's cleanup programs from initial site investigations and remedy selection through the design, implementation, and operation and maintenance of a site's remedy.

The site's potential to support facilities serving the nearby Texas City deep-water terminal became evident fairly early in the cleanup process. This helped to inform the site remedy and maximize the amount of space available for redevelopment. Furthermore, the Tex Tin Corp. Superfund site received the nation's first RfR Determination, which helped attract interest in the site. Since Tex Tin, many other sites have received this designation, further encouraging redevelopment at contaminated sites.

EPA also works with site stakeholders to consider how future land use considerations can inform the implementation and long-term stewardship of site remedies as well as cleanup planning. At some sites, for example, reuse considerations can inform the future location of groundwater monitoring wells and other operation and maintenance equipment that might inadvertently hinder redevelopment efforts. At other sites, detailed site reuse plans have provided additional benefits that save time and reduce redevelopment costs. For example, future infrastructure corridors or building footers can be installed in coordination with site cleanup activities. Considering future use during cleanup design and construction ensures that cleanup outcomes align with community priorities.

Timeline of Events

<i>1942-1956</i>	An emergency tin supply plant operates on site during World War II.
<i>1956-1991</i>	Private companies continue smelter operations at the site.
<i>1990</i>	EPA lists the site on the NPL.
<i>1991</i>	Tex Tin Corporation challenges NPL listing in Federal Appeals Court.
<i>1993</i>	Site removed from the NPL by court order.
<i>1998</i>	Site relisted on the NPL.
<i>1998</i>	Amoco implements and completes response actions under the Texas Voluntary Cleanup Program for OU2, the former BP-Amoco Co. facility.
<i>May 1999</i>	EPA selects the remedy for OU1 (former smelting facility).
<i>June 1999</i>	EPA completes cleanup of OU3 (residential properties).
<i>September 2000</i>	EPA updates the OU1 remedy.
<i>September 2001</i>	EPA selects the remedy for OU2 and OU4 (Swan Lake Salt Marsh).
<i>2001</i>	EPA's Superfund Redevelopment Initiative awards Texas City a Superfund Redevelopment pilot grant.
<i>2002</i>	EPA takes OU2 off the NPL.
<i>2003</i>	EPA issues the nation's first RfR Determination for OU1 and OU2.
<i>2005</i>	Site cleanup finishes.
<i>2005</i>	Site ownership transfers to Phoenix International Terminals.
<i>2010</i>	The Texas City Terminal Railway Company acquires the site property from Phoenix International Terminals.
<i>November 2015</i>	Genesis signs a long-term lease with the Texas City Terminal Railway Company for part of the site property.
<i>May 2016</i>	Genesis begins building its Texas City Terminal on site.
<i>May 2017</i>	Genesis opens the Texas City Terminal on site.
<i>November 2017</i>	EPA Region 6 presents Excellence in Site Reuse awards to site stakeholders.

The Bigger Picture

While these site-specific conditions create an ideal climate for successful reuse outcomes, there are also a range of broader lessons learned that can help guide similar projects at contaminated lands across the country.

EPA works closely with communities and responsible parties to promote and support site cleanups that allow for redevelopment.

EPA places a high priority on supporting the return of contaminated sites to productive and beneficial uses. At the Tex Tin Corp. Superfund site, EPA provided a Superfund Redevelopment Initiative pilot grant to Texas City to help identify community reuse priorities and fund a reuse assessment plan. In turn, these findings helped guide cleanup and redevelopment planning.

Communicate, collaborate and build relationships.

EPA, the Tex Tin Steering Committee and PNL have worked together closely for years, and they demonstrated a remarkable ability to tackle complex site conditions and unexpected challenges along the way. By the time Genesis began its redevelopment work on site, the project team had extensive experience working together collaboratively, seeking ways to address multiple priorities and needs at the same time.

Recognize the leadership role of local governments.

The Texas City mayor's office has been extensively involved in site discussions. This involvement has continued across the administrations of three mayors. From coordinating reuse planning efforts funded by the Superfund Redevelopment Initiative pilot grant to pushing for cleanup to begin and demolition to occur before hurricane season, the mayor's office has demonstrated sustained support for the site's cleanup and redevelopment. EPA and the Tex Tin Steering Committee's regular briefings at the mayor's office helped to continue and strengthen the project's relationship with Texas City.

Early discussions about operation and maintenance responsibilities can provide a way to bring responsible parties and developers together with a shared interest.

Responsible parties typically conduct long-term operation and maintenance activities, such as monitoring and mowing, to ensure that site remedies remain protective over time. By discussing operation and maintenance responsibilities early in the process, both redevelopment parties and responsible parties can ensure prioritizing the continued protectiveness of the site remedy. In addition, when another party uses the property productively after cleanup, the responsible parties may be able to share portions of its O&M responsibilities with them.

Using a phased approach at complex sites can help expedite the cleanup process and result in remedial cost efficiencies.

At the Tex Tin Corp. site, one reason cleanup work was able to move forward ahead of schedule was because there was no need to wait for approval of all remedial designs. This approach allowed complex design work to be conducted while another part of the site's remedy was under construction. The project team could also be flexible and responsive to changing site conditions. Because of the large site size and varied remedial work, if an obstacle temporarily blocked one part of the cleanup, it would not stall the entire project. In addition to time savings, the phased approach resulted in lower overall cleanup costs.

Relying on reuse-focused support tools such as RfR Determinations and PPAs can encourage the redevelopment of Superfund sites.

The Tex Tin Corp. site was the first site in the nation to receive an RfR Determination; they are now awarded in all 10 EPA Regions. EPA's official documentation that the remedy was protective for industrial uses as long as certain site conditions were met reassured developers and attracted interest in the site. Genesis staff pointed to the RfR Determination as well as the site's PPA as key factors in their evaluation of the site's redevelopment potential and their decision to move forward with the Texas City Terminal project.

Conclusion

Before cleanup, the Tex Tin Corp. site was one of the most complex Superfund sites in the country, featuring highly acidic sludge, slag piles, waste pits, water treatment ponds, naturally occurring radioactive materials and asbestos. Innovative cleanup approaches, early reuse planning efforts, and extensive collaboration among the site's responsible parties, the local government, EPA and TCEQ resulted in the site's expedited and cost-efficient cleanup and return to use. Today, the Texas City Terminal is fully operational on part of the site, employing multiple people, generating tax revenues and distributing oil to nearby refineries. The site also supports a storage and laydown facility. The cleanup and redevelopment of the Tex Tin Corp. Superfund site illustrates how once-contaminated lands can host large-scale industrial reuses and foster sustained economic development in once-blighted areas.

COLLABORATION AND INNOVATION LEAD TO EXPEDITED CLEANUP AND INDUSTRIAL REDEVELOPMENT

THE TEX TIN CORP. SUPERFUND SITE IN TEXAS CITY, TEXAS

Sources and Resources

Sources

Images and maps for this case study are provided courtesy of EPA Region 6.

Resources

EPA Ready for Reuse Determination – OU2:
semspub.epa.gov/src/document/06/300126

EPA Region 6 Success Story:
semspub.epa.gov/src/document/06/300105

EPA Site Redevelopment Profile:
semspub.epa.gov/src/document/HQ/100001039

EPA Superfund site page, including site decision documents:
www.epa.gov/superfund/tex-tin

EPA Superfund Redevelopment Initiative:
www.epa.gov/superfund-redevelopment-initiative

Remediation, Redevelopment, and Reuse of the Former Tex Tin Superfund Site:
cese.utulsa.edu/remediation-redevelopment-and-reuse-of-the-former-textin-superfund-site



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In May 2017, EPA established a task force to restore the Superfund program to its rightful place at the center of the Agency's core mission to protect health and the environment.

epa.gov/superfund/superfund-task-force